Comparison of the Unidentified Animal with Fishes*

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In this short note we attempted to present a gross-morphological picture of the unidentified animal based on what we consider to be utilizable information, and compare it with some known species of fish. Owing to the scantiness of reliable information, the comparison is inevitably rough. Nevertheless, we feel that such gross-morphological examination will be one of the necessary steps to elucidate the nature of this animal.

Pieces of information on which our work was based are (1) M. Yano's measurements of the carcass, (2) his observations on the features of the carcass restricted to body parts that should have been clearly visible from the outside, and (3) body parts shown in the photographs (Pl. 1) which are clearly identified and permit no divergent interpretations. Yano's sketch (Pl. 2) was not referred to because it was produced after the carcass was thrown away from the Zuiyo-maru and greatly disagree with the measurements he himself made.

Utilized information on the body structure

Measurements taken: The head was 45 cm in length, the neck 150 cm, the tail 200 cm and the overall length of the body 1,000 cm.

Body structures verbally reported: It is unknown whether the upper jaw was present or not. The lower jaw had been lost. The vertebral column in the middle part of the trunk was 15 cm in diameter. There were no spines of the vertebrae. The ribs were about 40 cm long. There were two anterior and two posterior fins each about 100 cm long and with a number of horny fibers. The right anterior fin showed a strange appearance, being frilled in the middle (Pl. 1D). No fin-like structures were noticed on the mid-dorsal and mid-ventral lines. The flesh was dark red, overlayed by a white, sticky, fat-like substance.

Features visible in the photographs: The skull is small compared with other portions of the body. A pair of large anterior limbs or fins is present. There is a large bone element which seems to be the pectoral girdle. White tissues and reddish muscles are readily recognized.

The animal recomposed and its comparison with fishes

On the assumption that there was a pair of large posterior limbs or fins, the animal had an extraordinarily long trunk (Fig. 1A). In no known fish species attaining a large size is the trunk so elongate. If the animal were a fish and had ordinary body proportions, a fin situated in such a posterior part of the body could not be but the lower lobe of the

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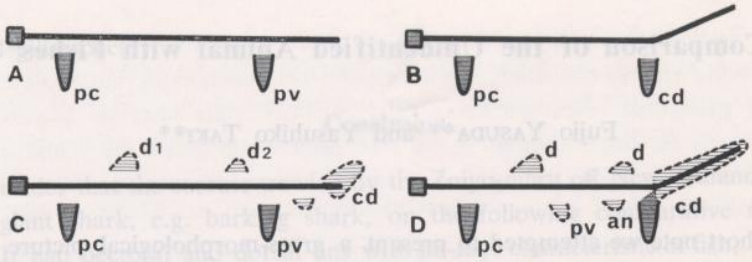

Fig. 1. Four possible body plans of the unidentified animal. an, anal fin; cd, caudal fin; d1, first dorsal fin; d2, second dorsal fin; pc, pectoral fin or anterior limb; pv, pelvic fin or posterior limb.

caudal fin (Fig. 1B). Further, if it were a fish, there should be a pair of pelvic fins, in the case of Fig. 1B, and one or more dorsal and anal fins (Figs. 1C and D).

The enormous size of the body and the structure of the vertebrae and of the anterior limbs or fins, among others, clearly indicate that the animal is not a bony fish. When the affiliation of the animal is looked for in fishes, it must be done in sharks.

Assuming that the unidentified animal is a shark, the body plans as in Figs. 1A and B are impossible. Some sharks, such as the frill shark *Chlamydoselachus anguineus,* have a small head and backward-positioned large pelvic fins as in the unidentified animal and no dorsal fin in the anterior and middle parts of the body (Kato *et al.*, 1967). However, their body size is far smaller than that of the unidentified animal and their pelvic fins are in more advanced position.

The basking shark *Cetorhinus maximus* and the whale shark *Rhincodon typus* are known to attain more than 10 m (Springer and Gilbert, 1976; Kato *et al.*, 1967). However, the former species has a larger head than in the animal under study, a large anterior dorsal fin in the middle of the trunk midway between the pectoral and pelvic fins, a posterior dorsal fin, an anal fin, and pelvic fins in more advanced position than in the unidentified animal (Kato *et al.*, 1967). The latter species has the same number of fins and a large first dorsal fin situated in the posterior half of the body (Kato *et al.*, 1967). In order to conclude that the unidentified animal is a basking or whale shark, we then must assume that 1) while the pectoral fins and the lower lobe of the caudal fin had remained attached to the body, the two dorsal fins, pelvic fins, anal fin and the upper lobe of the caudal fin had all been lost (Fig. 1D) or otherwise overlooked by the observers, 2) anterior parts of the skull were also lost, and 3) M. Yano counted by mistake a single lobe of a fin as two. We consider it difficult to arrive at a conclusion on so many assumptions.

Incorporating all these observations, we are not able to find any known living fish species which agree with the unidentified animal trawled off New Zealand. If it is a species of shark, it may represent a species unknown to science.

Literature cited

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Kato, S., S. Springer, and M. H. Wagner. (1967): Field guide to eastern Pacific and Hawaiian sharks. U.S. Dept. Interior, Circular 271, 44 pp., 75 figs.